

Functional Design Overview - Size and Capacity

The Fredericksburg deck is a three story structure with a pitched roof in selected areas. The deck offers parking at grade level plus three supported levels (one level less than the original proposal). It provides 297 spaces of parking within its structure. The overall dimensions of the deck are approximately 197' long by 127' wide. Maximum height of the deck as measured from grade to the top deck floor is 36'-8". The deck size is a total of 97,500 square feet.

Minimum clearance within the deck is 7'2" with an area on the first floor that offers 8'2" for ADA van accessibility. Floor to floor heights are typically 10'-10". The first floor is configured to be 11'-11" to the second floor at the north end and 11'-0" at the south end.

Vehicle Ingress Egress

The main vehicle entry/exit point for the parking deck is at the south of the site, allowing for queuing along Wolfe Street. This design also helps eliminate back up in the garage, compared to an entrance off more frequently traveled main roads such as Sophia or Caroline. A single main entrance also minimizes the amount of future revenue control equipment required and reduces impact on traffic along Sophia. A single vehicle entry/exit is more than adequate for a parking deck of less than 300 spaces.

For optimal flexibility, however, the functional and architectural design could be further developed to support the addition of a second vehicle entry/exit along Sophia. This optional entrance would likely be used for valet parking as such an application would minimize lost spaces should this entrance be added. This optional entrance has the disadvantage of eliminating a minimum of two spaces, even for specialty/valet use and adding additional cost. In addition, the single entry/exit along Wolfe is better located from a traffic logistics point of view and is more than adequate to handle the volume and mix of the 297 car capacity of this garage.

To add this second entrance Donley's would modify the design and cost to include a curb cut, operational versus mock doors and the installation of minimal parking control equipment to control valet use.

Ramping System, Vehicle Circulation & Parking Geometrics

Vehicles circulate between floors through ramping on the east and west elevations. Typical ramp slopes are approximately 5%, with first floor ramps at 5.86% (East Side) and 5.2% (West Side), all of which are within the guideline recommendations of the National Parking Association.

By confining ramping to only two sides, the north and south elevations are free of slanted ramps. Two-way circulation, 90 degree stalls and double striping of all spaces make circulation, ingress/egress and parking easy to understand, fast and safe. The drive aisle width for the proposed two-way traffic, 90 degree parking is a minimum of 20 feet. This drive aisle width meets the recommendations of the City of Fredericksburg.

The functional layout, including parking geometrics, spacing and circulation are shown on the architectural drawings. The majority of spaces (approximately 228) measure 9' wide by 20' deep, which is oversized compared to most decks. This size matches the City's standard for surface lot spaces. (NOTE: There is no City standard for space dimension for parking decks). In order to allow for architectural design requirements, parking spaces in the end bays (a total of approximately 62 spaces) are 9' wide by 18' deep. This still exceeds the industry standard of 8'6" by 18' dimension that Donley's has utilized on most of its decks including those at The University of Virginia (2 decks), George Mason University and Northern Virginia Community College in Annandale.

ADA Compliance

There are seven ADA parking spaces. These spaces are located on each level next to the elevator for ease of use. On the first floor, the ADA space is within an area of the deck that provides 8'2" clearance, allowing this space to be accessible for a standard van. The number of ADA spaces and availability of a single van accessible ADA space within the garage meets or exceeds ADA requirements.

Pedestrian Circulation

Pedestrian access to the garage is located at the southeast, southwest and west side of the garage, providing very flexible access for such a small parking deck. Along with direct access to Wolfe And Sophia, the southwest and west entrance/exit points allow quick and easy access to Caroline via either the sidewalk on Wolfe or a new pedestrian walkway between the west stair entrance and Caroline (see drawings).

Vertical circulation is provided at these same points with an elevator at the southwest corner and stairs at the southeast and west entrance points. Once again, the vertical transportation is very flexible and exceeds the minimum industry standards and requirements of a single stairway for a deck of this size.

Safety

Openness of the deck along the Executive Plaza side and proper lighting as described later in this section aid passive security. Standard painting of elevator areas and stairwells and the option of painting the ceiling (bottom of double tees), columns and beams can further lighten the interior of the deck and increase passive security. Use of interior wall panels and a long span design help to minimize areas for people to hide and help eliminate blind corners as vehicles circulate the ramp. These design elements increase passive security. Glazed window openings in the back of the elevator tower, along with glass backed elevators, also improve visibility and enhance passive safety.

Security Cameras

Please note that the majority of owners do not utilize cameras as, once installed, typical requirements are to provide 24 hour a day monitoring by security personnel. However, if cameras are desired by the owner, Donley's can provide conduit for potential future security camera locations at an additional cost.

Structural System & Durability Factors

Foundations are spread footings as shown on the structural drawings. Foundations are based on soil borings taken earlier in our analysis of the existing soils and are designed to handle industry standard live and dead loads. The interior structural system is made of pre-cast beams, columns, wall panels, shear panels and double tees for the structured floors. The pre-cast wall panels provide both structural support and a back up for the hand laid brick façade. Location of all wall panels and shear walls (for lateral stability) are provided in the architectural drawings. In limited areas where pre-cast wall panels are not practical, masonry block will be used as the structural back up for hand laid finished exterior brick.

The concrete floor system will be pre-topped, precast, prestressed double tees. Joints between adjacent concrete units will be sealed using polyurethane joint sealant. Penetrating silane sealer will be applied to all floor members to provide added long-term protection.

Structural System & Durability Factors (continued)

The parking deck is designed to the standards of ACI (American Concrete Institute)-362, a specification developed to ensure durability in parking decks. This standard, when combined with recommended maintenance, is the City's assurance of a quality structural design that will provide a 40 to 50 year life. These and other standards are further defined in the outline specification at the end of this section. Below is a summary of key ACI-362 standards of durability that Donley's will meet or exceed.

- Precast Concrete:
 - 5,000 psi concrete strength (minimum)
 - 6 ½% air content
 - 0.4 maximum water to cement ratio
- Reinforcement cover:
 - 1 ½" P/C top of Flange
 - 1 ½" PC –Other Sides
 - 1 ½" PC –Beams
 - 1 ½" PC –column
 - 1 ½" PC –Exterior Face
- Stainless Steel P/C Flange edge connectors
- Hot dipped galvanized P/C exposed plates
- Two (2) gallons per cubic yard of corrosion inhibiting admixture in all double tees
- Concrete sealer on all structured floors, upturned spandrel beams and columns for a distance of three feet above parking decks.

The outline specification and drawings also detail such factors as drainage slope, drains and expansion joint systems--all key factors in long term durability.

Lighting

Specified lighting levels will meet or exceed the recommendations of the National Parking Association. Light fixtures will be 175-watt under-deck metal halide light fixtures and 400-watt metal halide roof level pole mounted twin fixtures. Average light levels will be as follows: parking-6 fc, drive entries/exits-40 fc daytime, 20 fc night, Stairs & Lobbies-20 fc, enclosed spaces-10fc. Emergency lighting shall be provided through either an emergency generator, battery back-up or UPS back-up system.

Power Systems

The new electrical service shall consist of a 277/480-volt, 3-phase, 4-wire main distribution service. The electrical service will be provided from the existing Dominion Virginia Power pad-mounted transformer. The secondary conductors from the transformer will be installed in accordance with VA Dominion power requirements.

In general, the elevators will be fed at 480-volts, lighting will be fed at 277 volts; and HVAC equipment, receptacles and other miscellaneous receptacles will be fed at 120 or 208 volts through a step-down transformer and 120/208-volt panel board.

Duplex receptacles (with NEMA 3R covers) shall be provided at mechanical equipment locations, the elevator machine room and elevator pit. Duplex receptacles shall be provided in the electrical room.

Fire Protection

Fire protection systems shall be provided in accordance with the Virginia Uniform Statewide Building Code. The Parking Deck shall have a manual dry standpipe system. Dry standpipes will be provided with fire department connections. Standpipes will be designed in accordance with NFPA 14. Fire extinguishers and cabinets will be provided in accordance with VUSBC. No fire alarm system is required by code and hence, none will be provided. A two-way communication system may be required in the stairwell areas-of-rescue assistance and conduit and 120-volt power rough-ins will be provided.

Vertical Transportation Systems

The principal pedestrian destination will be Caroline Street going either North or South (and into the Executive Plaza). As a result and due to architectural design, the elevator was located in the southwest corner of the building, allowing access to Caroline street via either the proposed pedestrian walkway or via the sidewalk on Wolfe Street. The elevator will be a 3500-pound hydraulic elevator sized for exterior operations. Stairways at the west and southeast elevators optimize patron convenience in entry/exit point options.

Parking and Access Revenue Control Systems

Per the City's request, we are providing an allowance in our costs for revenue control equipment. This will allow the City to better define its needs later in the process as it solidifies any agreements with private users such as future hotels. Based on the size of the deck and the proposed usage, a number of totally automated, fairly simple solutions should be adequate for revenue control.

The Donley team can advise the owner once the final applications, mix of users and their specific requirements are further defined. If the cost of the system is less than the allowance, the difference will be refunded to the City. If the cost is greater, the City will be required to pay the difference.

Site Layout and Features

Construction of the new parking structure will necessitate the rerouting of existing sanitary and stormwater systems. The existing 6" sanitary sewer service from the Executive Plaza building will be captured with a manhole and redirected to the existing sanitary system in Wolfe Street. The stormwater collection system from the Executive Plaza building will also be redirected. A new manhole will be set behind the proposed parking structure and new 12" piping will extend around the structure to the existing stormwater system in Sophia Street. An oil-water separator will be installed at the northeast corner of the building to treat stormwater runoff from the parking deck prior to piping it into the City's drainage system. The existing 12" waterline in Sophia Street will be tapped and extended to the northeast corner of the parking structure. At that corner, a frost-free hydrant will be installed for a 2" wash down.

The existing curb and median along Wolfe Street will be cut to provide an entrance into the parking deck. Additionally, the current drive entrances along Sophia Street will be filled and new curbing provided. A paved driving aisle and pedestrian walkway will be provided behind the parking structure. The new pavement will tie into the existing parking area for the 3-story building at 613 Caroline Street. The extent of sidewalks is described on the Architectural site plan.

There are several utility company services including electric, telephone, and gas that need to be relocated to accommodate the new facility. At this time, allowances have been established for these items since the work is done by the respective utilities. A summary of allowances is provided in the Design Detail portion of this section.

A phased erosion and sediment control plan must be developed and coordinated with the site work.